CLAIMS

What is claimed is:

1. A method comprising:

forming at least one metal layer having a standing-wave structure to distribute a clock signal to receiver end points from a clock source such that the receiver end points are substantially electrically equivalent with respect to the clock source; and

embedding the metal layer in a dielectric layer made of a thick film using a wafer-level thick film (WLTF) process.

2. The method of claim 1 wherein forming comprises:

forming at least the metal layer having the standing-wave structure in one of an M-ary tree and a combination of M-ary trees of different degrees M.

3. The method of claim 1 wherein forming comprises:

forming at least the metal layer having the standing-wave structure in one of a two-dimensional configuration and a three-dimensional configuration.

4. The method of claim 1 wherein forming comprises:

forming at least the metal layer having the standing-wave structure in a stacked-die configuration.

5. The method of claim 1 further comprising:

forming a via layer below the metal layer.

6. The method of claim 5 further comprising:

forming a back end of line (BEOL) layer below the via layer and on a substrate.

7. The method of claim 6 wherein forming the BEOL layer comprises:

forming a BEOL layer made of copper and dielectrics.

8. The method of claim 1 wherein forming comprises:

forming at least one power delivery area on the metal layer.

9. The method of claim 1 wherein embedding comprises:

embedding the metal layer in dielectric layers made of benzocyclobutene (BCB).

10. The method of claim 1 wherein forming comprises:
forming the metal layer having a thickness between 10 microns to 50 microns.

11. A device comprising:
dielectric layers made of thick film; and
at least one metal layer embedded in the dielectric layers and having a standing-wave structure to distribute a clock signal to receiver end points from a clock source such that the receiver end points are substantially electrically equivalent with respect to the clock source.

12. The device of claim 11 wherein the standing-wave structure is one of a M-ary tree and a combination of M-ary trees of different degrees M.

13. The device of claim 11 wherein the standing-wave structure is in one of a two-dimensional configuration and a three-dimensional configuration.

14. The device of claim 11 wherein the standing-wave structure is in a stacked-die configuration.

15. The device of claim 11 further comprising:
a via layer below the metal layer.

16. The device of claim 15 further comprising:
a back end of line (BEOL) layer below the via layer and on a substrate.

17. The device of claim 16 wherein the BEOL layer is made of copper and dielectrics.

18. The device of claim 11 wherein the metal layer comprises:
at least one power delivery area.

19. The device of claim 11 wherein the dielectric layers are made of benzocyclobutene (BCB).

20. The device of claim 11 wherein the metal layer has a thickness between 10 microns to 50 microns.

21. A die comprising:
a substrate; and
a metallization layer on the substrate, the metallization layer comprising:
dielectric layers made of thick film, and
a metal layer embedded in the dielectric layers and having a standing-wave structure to distribute a clock signal to receiver end points from a clock source such that the receiver end points are substantially electrically equivalent with respect to the clock source.

22. The die of claim 21 wherein the standing-wave structure is one of an M-ary tree and a combination of M-ary trees of different degrees.

23. The die of claim 21 wherein the standing-wave structure is in one of a two-dimensional configuration and a three-dimensional configurations.

24. The die of claim 21 wherein the standing-wave structure is in a stacked-die configuration.

25. The die of claim 21 wherein the metallization layer further comprises:
a via layer below the metal layer.

26. The die of claim 25 wherein the metallization layer further comprises:
a back end of line (BEOL) layer below the via layer and on a substrate.

27. The die of claim 26 wherein the BEOL layer is made of copper and dielectrics.

28. The die of claim 21 wherein the metal layer comprises:
a power delivery area.

29. The die of claim 21 wherein the dielectric layer is made of benzocyclobutene (BCB).

30. The die of claim 21 wherein the metal layer has a thickness between 10 microns to 50 microns.